*The Times* (18 March) said that this revelation placed further pressure on the government. While official advisers were about to recommend proscription, "the drug will not be formally banned until at least the summer as further consultation is needed on whether it should be a Class A, B or C drug."

The tone of many radio and television bulletins was that it was perfectly obvious that mephedrone had killed the two boys in Scunthorpe, and that the need to make its use illegal was equally self-evident. Chat shows and phone-ins added other ingredients, ranging from perplexity to outrage.

*The Guardian* (18 March) took particular care to put calls for immediate action into a wider perspective, reinforced by a thoughtful article by David Nutt, sacked last October as chairman of the UK's Advisory Council on the Misuse of Drugs (Curr. Biol. (2009) *19*, R1011). "I support the government's position that to rush into controlling mephedrone is premature, as previous claims of fatalities from this drug have turned out to be false alarms," he wrote. "To make it illegal without proper evidence would be wrong and might have unwanted consequences, such as a switch to more dangerous drugs or alcohol." The European Monitoring Centre for Drugs and Drug Addiction was assessing the situation and would report in July.

**Experts and regulatory committees have become increasingly concerned about possible hazards of these substances, which are derived from cathinone. They induce effects similar to those of amphetamine but have been less thoroughly studied.**

As an alternative to outright proscription, Nutt discussed the possible introduction of a new Class D, as used in New Zealand. Sales of substances in this category are limited to the over-18s, the product is quality-controlled so that users know what they are getting, and it comes with health education messages. "Another approach that should seriously be considered is to make available testing facilities," Nutt wrote, "so that people can check what they have brought and so ensure as far as possible that they use appropriate doses and apply the best safety approaches."

**"Attempting to scare teenagers about the dangers of drugs is pointless: their brains are wired up to take risks"**

The most robust assertion that meow meow should be legal was in an opinion piece by Antonia Senior in *The Times* (19 March). Below an introduction saying that "attempting to scare teenagers about the dangers of drugs is pointless: their brains are wired up to take risks", Senior argued against what she called a knee-jerk political reaction to the two deaths in Scunthorpe.

"It is an absurdity to have one legal, dangerous drug when all others are prohibited. Except alcohol. Oh, and tobacco. And methadone, of course, but that's different, apparently, because the State's the dealer," Senior wrote. "So ban mephedrone, and then the kids who want to get high will be forced back to their usual haunts, of back streets and alleyways. Their dealers will be delighted to welcome them back into the fold and be given a chance to practise what a legitimate business would call 'cross-selling'. How about some crack with your miaow miaow, little girl?"

*The Observer* (21 March) summarised the debate most effectively by providing four contrasting perspectives. A dealer announced that his sales had doubled following publicity over the Scunthorpe deaths, but accepted that mephedrone will be banned. A user was horrified by the effect it had had on him and his friends. A parent said she accepted David Nutt's arguments intellectually but rejected his Class D suggestion "on a more visceral, instinctive level". And a medical consultant on addiction argued that 'legal highs' were "an easy target for moral outrage", while calling for a much wider debate about "Britain's prodigious demand for drugs, legal and illegal".

Bernard Dixon is the European editor for the American Society for Microbiology.

# Wave power set to roll

A new cluster of wave and tidal power devices off the coasts of Scotland is set to produce renewable energy by 2020 and help counter climate change. **Michael Gross** reports.

*Pelamis platurus* is a yellow-bellied sea snake that lives in the tropical and subtropical parts of the Pacific and can grow up to around 80 cm long. Somewhat larger is its namesake, the Pelamis wave energy converter, due to be released to the unruly waters of the North Sea within the next few years. At 150 metres in length and 3.5 metres in diameter, this artificial sea snake, developed by Edinburgh-based company Pelamis Wave Power, consists of cylindrical elements connected by hinged joints. Hydraulic elements driven by the relative movement of these segments as they ride the waves will power generators inside the machine.

The Pelamis machine is one of several designs featured in a £4 billion plan to establish commercial marine energy devices off the coasts of Scotland within the next five to ten years. In March, the crown estate, which owns the seabed around the UK coasts, and the Scottish government named ten sites for wave and tidal power generation measures with a total of 1.2 GW of renewable energy, corresponding to the output of a typical nuclear power station.

**Time will tell which of the technologies that now get the opportunity to prove themselves will continue to rule the waves and contribute renewable energy towards the famous 2020 targets.**

Pelamis Wave Power (PWP) will build swarms of sea snakes for three sites each due to reach 50 MW capacity. One will be developed by E.ON UK, one by Scottish Power Renewables — both located off the west coast of the Orkney islands — and one by PWP themselves off the


**On a roll**: New wave power devices like this Pelamis are being installed off north-east Scotland. (Photo: Pelamis Wave Power http://www.pelamiswave.com.)

north coast of Sutherland. PWP is also involved in a smaller, 20 MW wave farm near the Shetlands, in a joint venture with the Swedish company Vattenfall.

The other projects now given the go-ahead by the Scottish government and the crown estate include a competing wave energy method and two kinds of tidal design. The Oyster machine built by the company Aquamarine, also based at Edinburgh, is a seabed-based wave power generator, which relies on the movement of a lever that is hinged to the ground. It will be deployed in a 200 MW installation developed by Scottish and Southern Energy in a joint venture with Aquamarine.

The tidal schemes are large underwater turbines or propellers fixed to the seabed and driven by tidal flows, so — in contrast to the large tidal schemes considered for the Severn estuary (see Curr. Biol. (2009) *19*, R180–R181) — there is no dam building involved.

Environmentalists warmly welcomed the scheme, which was announced shortly after a major offshore wind energy project. Duncan McLaren, Friends of the Earth Scotland Chief Executive, said: "The tidal and wave developments further vindicate the findings in the 'Power of Scotland Renewed' report [published by Friends of the Earth in 2009] that Scotland could become independent of coal and nuclear power by 2030."

However, McLaren also advised caution as the methods are all relatively new, and unexpected side effects cannot be ruled out: "Friends of the Earth Scotland recognizes that large scale renewables can have serious environmental impacts, and that we know less about the marine environment than Scotland's land-based projects. We therefore welcome the 'deploy and monitor' approach proposed in this licensing round, and call for assurances that detailed monitoring will be undertaken, and evidence of negative impacts addressed through immediate remedial action."

By covering four fundamentally different technologies, the plan acknowledges the fact that this kind of power generation is still in an exploratory phase and that the best solution in terms of cost efficiency, durability, and minimal environmental impact has yet to be identified. This impression is confirmed by the fact that developments elsewhere rely on other technologies yet again.

The first commercial-scale wave farm in the US, due to be built off the coast of Oregon, uses ten buoys, which will be 50 metres tall but mostly submerged, with a float moving up and down with the waves, generating 150 kW each. The developer, Ocean Power Technologies, has received support from the US Department of Energy among other sources. In December 2009, the company deployed one of its buoys at the US Marine Corps Base Hawaii (MCBH) at Kaneohe Bay as part of its ongoing program with the US Navy for ocean testing and demonstration of its devices.

Durability of large devices battered by the elements day in and day out is a key issue in marine energy projects. Although a group of PWP's sea snakes was successfully launched as the first ever wave farm off the coast of Portugal in 2008 and generated electricity for a couple of months, the installation then developed a leak and had to be towed back to dry land, where it has remained stranded due to financial difficulties of the company operating the project.

Another crucial factor will be the availability of appropriate infrastructure measures needed to connect the devices in remote locations to the mainland electricity grid. The marine energy projects may benefit from a plan for a major international direct current grid designed to pool renewable resources around the North Sea (see Curr. Biol. (2010) *20*, R80–R81).

Time will tell which of the technologies that now get the opportunity to prove themselves will continue to rule the waves and contribute renewable energy towards the famous 2020 targets.

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